



May 8, 2020

Mr. Todd Davis
Site Assessment Manager
U.S. Environmental Protection Agency, Region 7
11201 Renner Blvd.
Lenexa, Kansas 66219

**Subject: Analysis of Brownfields Cleanup Alternatives Report
Mead Hansen Building, 408 S. 8th Street, St. Joseph, Buchanan County, Missouri
U.S. EPA Region 7, START 5, Contract No. 68HE0719D0001,
Task Order No. 19F0101.004
Task Monitor: Todd Davis, Site Assessment Manager**

Dear Mr. Davis:

Tetra Tech, Inc. (Tetra Tech) is submitting the attached Analysis of Brownfields Cleanup Alternatives report regarding the Mead Hansen Building site in St. Joseph, Missouri. If you have any questions or comments pertaining to this submittal, please call the Project Manager at (816) 412-1772.

Sincerely,

A handwritten signature in black ink that reads 'John R. Simpson'.

John R. Simpson, CHMM
START Project Manager

A handwritten signature in blue ink that reads 'Ted Faile'.

Ted Faile, PG, CHMM
START Program Manager

Enclosures

ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES REPORT

**MEAD HANSEN BUILDING
408 S. 8TH STREET
ST. JOSEPH, MISSOURI**

Superfund Technical Assessment and Response Team (START) 5

Contract No. 68HE0719D0001, Task Order No. 19F0101.004

Prepared For:

U.S. Environmental Protection Agency
Region 7
11201 Renner Blvd.
Lenexa, Kansas 66219

May 8, 2020

Revision 02

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1.0 INTRODUCTION

Tetra Tech, Inc. (Tetra Tech) Region 7 Superfund Technical Assessment and Response Team (START) was tasked by the U.S. Environmental Protection Agency (EPA) Region 7 Superfund Division to conduct a Phase II Targeted Brownfields Assessment (TBA) and Analysis of Brownfields Cleanup Alternatives (ABCA) of the approximately 0.71-acre Mead Hansen Building site (the site), in St. Joseph, Buchanan County, Missouri (see Appendix A, Figure 1). The subject property is currently unoccupied and includes one building and an asphalt parking area. The site has historically been occupied by a lumberyard, a car dealership, and a service garage. The most recent usage of the subject property was as a chemical mixing and storage facility for HPI Products.

A Tier I Risk Assessment, completed by Tetra Tech, concluded that no remediation of environmental media (soil and groundwater) may be necessary, based on anticipated future use of the subject property by the City of St. Joseph, Missouri (the City) as a parking lot and the nature and extent of contamination detected in soil and groundwater at the site (Tetra Tech 2018a). Therefore, this ABCA presents cleanup alternatives regarding only asbestos-containing material (ACM) and lead-based paint (LBP) in the site building. Cleanup alternatives considered are based on state and federal regulations. Missouri Department of Natural Resources (MDNR) regulations outline ACM and LBP inspection, reporting, and disposal requirements for demolition or renovation of commercial buildings (MDNR 2017). This ABCA report also includes preliminary cost estimates of evaluated cleanup alternatives.

Cleanup alternatives in the report are specifically provided for the City's proposed future use of the site as a parking lot and that the property will be remediated through the MDNR Brownfields/Voluntary Cleanup Program (B/VCP). If the site is not remediated through the MDNR B/VCP then other federal and state regulations may be applicable. The property is currently part of a RCRA Consent Decree. Prior to consideration of any property transaction and/or enrollment of this property in MDNR's B/VCP, coordination regarding the status of the Consent Decree and the Unilateral Administrative Order is recommended among the EPA enforcement case team, the U.S. Department of Justice, and any party interested in acquiring the property.

2.0 SITE BACKGROUND AND DESCRIPTION

The site is included on the St. Joseph North, Missouri, U.S. Geological Survey (USGS) 7.5- minute topographic series map (USGS 1997) (see Appendix A, Figure 1). The site is in the southwest quarter of Section 8, Township 57 North, Range 35 West. Coordinates at the approximate center of the site are 39.7637690 degrees north latitude and 94.8510450 degrees west longitude. The parcel identification number for the subject property is 06-3.0-08-004-003-055.000 (Buchanan County Geographic Information System [GIS] Map Portal 2018).

The site is occupied by a vacant industrial building and an asphalt parking lot on the north-central portion of the property. The site includes 408 and 424 S 8th Street in downtown St. Joseph, Buchanan County, Missouri. The area surrounding the site is primarily commercial and industrial. Figure 2 in Appendix A illustrates the location and boundaries of the site. The site is bounded north by an imported foods store and Sylvania Street, east by S 8th Street with an International Brotherhood of Electrical Workers building and metal service shop beyond, south by Angelique Street and a motor shop beyond, and west by an alleyway with an auto repair shop, vacant lot, and St. Joseph Fire Department.

Based on a review of historical sources, the site was developed as early as 1883. Historical documents and interviews indicate the subject property was previously occupied by a lumberyard, residential dwellings, car dealership and service garage, and jewelry store; and most recently, a storage/dry chemical mixing facility for HPI Products, which provides contract packaging, and formulation services to agriculture, industrial, detergent, and chemical markets.

3.0 PREVIOUS INVESTIGATIONS

In October 2016, Seagull Environmental Technologies, Inc. (Seagull) conducted a Phase I Environmental Site Assessment (ESA) on behalf of MDNR B/VCP. The Phase I ESA documented several recognized environmental conditions (REC), including (Seagull 2016):

- A multimedia inspection by EPA revealed improper storage and handling of chemicals including more than 300 containers of various materials throughout the building.
- The property was occupied by HPI Products according to the following databases: Resource Conservation and Recovery Act (RCRA) Non-generator/No Longer Regulated (NLR), EPA Watchlist, and Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS).
- Historical uses of the site included an automotive sales and repair shop.
- Historical uses of north adjacent properties included auto repair.

Tetra Tech completed a Phase II TBA in April 2018, collecting samples of soil, groundwater, floor drain sediment, floor sweepings, and water from inside floor drains to confirm or eliminate the RECs identified during the 2016 Seagull Phase I ESA, and to identify the nature of contamination (if present) and risks posed by that contamination. Building material samples were also collected to confirm or eliminate environmental concerns regarding ACM and polychlorinated biphenyls (PCB), and areas of suspect LBP were screened to determine adverse environmental impacts.

Sampling results during this Phase II TBA indicated only minimal detections of contaminant analytes in surface soil, subsurface soil, and groundwater at the site. Notably, surface and subsurface soils and groundwater across the subject property contained levels of metals exceeding Missouri Risk-based Corrective Action (MRBCA)-established Default Target Levels (DTL) and non-residential standards. Other than the metals detections, only one subsurface soil sample contained concentrations of volatile organic compounds (VOC), and one groundwater sample contained a total petroleum hydrocarbons (TPH) – diesel range organics (DRO) concentration that exceeded the MRBCA DTL. Samples collected from the floor drains and floor sweepings contained a larger number of contaminants, including VOCs, semivolatile organic compounds (SVOC), pesticides, herbicides, TPH, metals, nitrate, and sulfate.

This Phase II TBA concluded that no remediation of environmental media (soil and groundwater) may be necessary, based on anticipated future nonresidential use of the subject property as a parking lot, as well as the nature and levels of analytes detected in soil and groundwater at the site (Tetra Tech 2018b).

Tetra Tech evaluated results of the Phase II TBA and prepared a Tier I Risk Assessment to evaluate risks to human and ecological receptors in December 2018 (Tetra Tech 2018a). The Tier I Risk Assessment indicated only limited detections of contaminants in surface soil, subsurface soil, and groundwater at the site. Regarding surface soils, no detectable concentrations of VOCs, SVOCs, pesticides, herbicides, TPH, or most metals were found to exceed an MRBCA Tier 1 risk-based target level (RBTL) for either the construction worker or non-residential land use. The most notable exception was arsenic. The maximum arsenic concentration in surface soils was above the MRBCA RBTL for non-residential land use; however, the representative arsenic concentration (site average) was found to be less than the MRBCA RBTL for non-residential land use. Regarding subsurface soils, no detected analyte was found to exceed an appropriate MRBCA RBTL. Groundwater sampling results indicated TPH-DRO and arsenic concentrations above MRBCA Groundwater Target concentrations. However, groundwater is not currently used as a drinking water source at the site, and because the facility is connected to the public water supply in St. Joseph, future use of groundwater as a potable water source is unlikely. Therefore, the Tier I Risk Assessment agreed with the conclusion of the Phase II TBA that no remediation of environmental media may be necessary based on the anticipated future use of the site and the nature and extent of contamination detected in soil and groundwater. However, institutional controls in the form of deed restrictions prohibiting residential development and installation of drinking water wells should be implemented.

Tetra Tech also completed a hazardous material survey at the subject property in April 2018 that identified regulated ACM and LBP in the property building (Tetra Tech 2018c). Based on these results and the conclusions of the Phase II TBA and Tier I Risk Assessment, this ABCA report presents cleanup alternatives regarding only ACM and LBP in the site building.

4.0 FUTURE USE

Future use of the site is anticipated as a paved parking area for the adjacent City of St. Joseph Fire Department headquarters. Groundwater in the site vicinity is not a source of drinking water, and no future use for this purpose is anticipated because drinking water to the area is provided by a municipal utility. Based on results from ACM and LBP surveys, abatement of asbestos would be required prior to building demolition. Results of the Phase II ESA indicated that concentrations of several contaminants in soil and groundwater at the site exceeded MDNR DTLs. However, based on the findings of the Tier I Risk Assessment, no unacceptable exposure risks are present. Therefore, no remediation of soil and groundwater is necessary for the planned future use as a parking area, and no soil or groundwater remedial options were evaluated in preparation of this report. No remedial activities have occurred at the site to date.

5.0 POTENTIAL CLEANUP ALTERNATIVES

The overall goal of any Brownfields cleanup action is to address environmental conditions preventing or impeding the preferred type of site redevelopment, and to do so in a manner protective of human health and the environment. This ABCA considers cleanup alternatives based on applicable state and federal regulations regarding ACM and LBP.

Brownfields cleanup alternatives were evaluated to address specific environmental impacts identified during the Tetra Tech Phase II TBA (Tetra Tech 2018b) and Tetra Tech ACM/LBP survey (Tetra Tech 2018c). The purpose of the ABCA is to present viable cleanup alternatives based on site-specific conditions, technical feasibility, and preliminary cost evaluations.

The following sections describe Brownfields cleanup alternatives for addressing ACM and LBP including a “No Action” alternative. Following the description, each alternative is evaluated in terms of its effectiveness, implementability, and cost. The purpose of evaluating each alternative is to determine its advantages and disadvantages relative to the other alternatives in order to identify key tradeoffs that would affect selection of the preferred alternative.

Effectiveness of an alternative refers to its ability to meet objectives of the Brownfields cleanup. Criteria applied to assess effectiveness of an alternative include the following:

- Overall protection of human health and the environment
- Compliance with applicable or relevant and appropriate requirements (ARAR) and other criteria, advisories, and guidance
- Long-term effectiveness
- Reduction of toxicity, mobility, or volume through treatment/removal
- Short-term effectiveness.

Criteria applied to assess implementability of an alternative are:

- Technical feasibility
- Administrative feasibility
- Availability of services and materials required during implementation of the alternative
- State acceptance
- Community acceptance.

Estimated cost of each alternative is determined, followed by comparisons of the alternatives' respective direct capital costs (including equipment, services, and contingency allowances).

5.1 EVALUATED CONTAMINATION

Contamination evaluated as part of this ABCA includes ACM and LBP. The sections below discuss contaminants/materials identified during the Phase II TBA and ACM/LBP survey at the site.

5.1.1 Asbestos-Containing Materials

During the ACM survey, Tetra Tech collected 70 bulk samples of suspect ACM at 22 homogeneous areas. Asbestos samples were collected in accordance with National Emissions Standards for Hazardous Air Pollutants (NESHAP) as adopted by EPA and Asbestos Hazard and Emergency Response Act of 1986 (AHERA) protocols. Upon completion of sampling activities, the bulk samples were sent to EMLab P&K, LLC (EMLab P&K) in Arvada, Colorado. Suspect ACM samples were analyzed per EPA Method 600/R-93/116 via Polarized Light Microscopy (PLM) analysis and, in some cases, 400 Point Count. AHERA defines ACM as any material or product that contains more than 1% asbestos. Figure 3 in Appendix A shows ACM sample locations. The ACM survey yielded the following significant findings:

- Regulated ACM was identified in the 9" X 9" tan floor tile/black mastic (approximately 20 square feet [ft²]) at the south entrance stairs. The floor tile was represented by samples FT-1, -2, and -3. Laboratory results indicated that the floor tile contained 2 percent chrysotile asbestos.
- Regulated ACM was identified in the square pattern linoleum/yellow mastic (approximately 50 ft²) at the east entryway. The linoleum was represented by samples LIN-1, -2, and -3. Laboratory results indicated that the linoleum contained 15 percent chrysotile asbestos.
- Regulated ACM was identified in the exterior boiler insulation (approximately 150 ft²) in the basement on the south boiler. The insulation was represented by samples IN-1, -2, -3. Laboratory results indicated that the insulation contained 10 percent chrysotile asbestos.
- Regulated ACM was identified in the transite panels (approximately 430 ft²) on the east and south sides of the exterior of the building and west side above the garage door. The transite was represented by samples Transite-1, -2, -3. Laboratory results indicated that the transite panels contained 20 percent chrysotile asbestos.
- Regulated ACM was identified in the exterior wall panel mastic (approximately 150 ft²) on the east side of the exterior of the building under the plastic panels. The mastic was represented by samples WM1-1, -2, -3. Laboratory results indicated that the mastic contained 10 percent chrysotile asbestos.

- Regulated ACM was identified in the aircell pipe insulation (approximately 530 linear ft) in the basement and manufacturing area. The aircell pipe insulation was represented by samples Aircell-1, -2, -3. Laboratory results indicated that the aircell pipe insulation contained 30 percent chrysotile asbestos.
- Regulated ACM was identified in the piping joint insulation (approximately 12" joint) in the basement on the south boiler. The joint insulation was represented by samples J-1, -2, -3. Laboratory results indicated that the joint insulation contained 30 percent chrysotile asbestos.

5.1.2 Lead-Based Paint

During the LBP survey, Tetra Tech tested 72 surfaces in the site building. The LBP survey accorded with protocols similar to the single-family housing inspection procedures in Department of Housing and Urban Development (HUD) *Guidelines for the Evaluation and Control of LBP in Housing* (HUD Guidelines) (HUD 1997). Tetra Tech utilized an Innov-X XRF spectrometer to perform the LBP screening. The Innov-X is a state-of-the-art XRF spectrum analyzing system for quantitative measurement of lead in paint on various substrates. HUD guidelines suggest that paint applied before 1978 could contain lead. HUD considers LBP as paint with lead levels above 1.0 milligram per square centimeter (mg/cm²). Figure 4 in Appendix A shows LBP sample locations. The LBP survey yielded the following significant findings:

- The tan painted wood door frame in the south/front entryway office tested positive for LBP with an XRF reading of 5.0 mg/cm².
- The blue painted wood door in the south/front entryway office tested positive for LBP with an XRF reading of 5.0 mg/cm².
- The blue painted wood door in the men's bathroom in the manufacturing area tested positive for LBP with an XRF reading of 1.01 mg/cm².
- The blue painted wood garage door on the interior of the manufacturing area tested positive for LBP with an XRF reading of 1.05 mg/cm².
- The cream-painted exterior garage door frame on the south side of the building tested positive for LBP with XRF readings of 2.14 mg/cm² and 2.46 mg/cm².
- Green-painted panels on the southeast exterior of the building tested positive for LBP with XRF readings of 4.13, 1.84, and 2.20 mg/cm².

5.2 EVALUATION OF CLEANUP ALTERNATIVES

Evaluations of cleanup alternatives are based on the anticipated future use scenario for the site—renovation and redevelopment for use as a paved parking area. Based on future use of the subject property as a parking area, and because building demolition is expected, only two alternatives were

considered for cleanup of ACM, and two options were evaluated to address LBP. Evaluations took into account MRBCA technical guidance and MDNR B/VCP procedural requirements—because cleanup projects implemented with EPA Brownfields Cleanup funding require participation in the MDNR B/VCP. For reference, fees associated with enrollment in the MDNR B/VCP include a \$200 application fee and refundable oversight deposit of \$5,000. Options evaluated for ACM and LBP assume occurrence of cleanup prior to demolition of on-site structures.

5.2.1 Asbestos-Containing Materials

Regarding ACM, three options were evaluated (1) no action, (2) O&M Plan, and (3) abatement of ACM. Alternative 3 can achieve clearance criteria under the MDNR B/VCP.

Alternative 1: No Action

Alternative 1 (no action) would leave ACM in place at the site.

Effectiveness

This alternative would not be effective if site buildings are demolished. Redevelopment of areas containing ACM would have to be restricted to ensure that those materials remain undisturbed. Additionally, in accordance with NESHAP regulations, demolition of buildings could not occur prior to proper abatement. This alternative would also be ineffective in achieving the goal of reducing health risks.

Implementation

Implementation of this alternative is straightforward—ACM left in place. Future redevelopment would have to consider the location and condition of the ACM, and ensure that those materials remain undisturbed. Demolition could not occur prior to abatement.

Cost

This alternative would not involve any direct costs.

Alternative 2: O&M Plan

Alternative 2 (O&M) would leave in place at the site ACM that is not damaged. Any damaged ACM would require abatement by a licensed State of Missouri asbestos abatement contractor in accord with applicable local, state, and federal regulations.

Effectiveness

This alternative could be effective if the goal was to rehabilitate the existing building. This alternative would also be effective in achieving the goal of reducing health risks. However, ACM that remains in place would have to be regularly monitored to ensure that it is not damaged, and future redevelopment plans would have to consider locations and condition of the remaining ACM, and ensure those materials would not be disturbed. If redevelopment plans include building demolition, this alternative would not be feasible.

Implementation

Implementation of this alternative would include leaving ACM in place and properly abating damaged ACM. An O&M Plan would be developed to document presence and locations of ACM, and future maintenance procedures regarding the ACM. In addition, filing the O&M Plan on the property's chain of title as an IC would be required.

Cost

Cost of completing an O&M Plan described above would be approximately \$5,000. This cost does not include abatement of damaged ACM.

Alternative 3: Abatement of Asbestos-Containing Material

Alternative 3 would involve, prior to demolition, abatement of the ACM identified in the site building. Abatement by a licensed State of Missouri asbestos abatement contractor would accord with applicable local, state, and federal regulations. Regulatory clearance would be obtained through successful implementation of a pre-approved Remedial Action Plan (RAP), including clearance sampling and pre/post-abatement inspections by MDNR (if required).

Effectiveness

If all identified ACM is removed, Alternative 3 would eliminate the risk to human health posed by ACM. In addition, full abatement would allow for redevelopment of the site without restrictions pertaining to disturbance of ACM.

Implementation

Abatement by a licensed State of Missouri asbestos abatement contractor would accord with applicable local, state, and federal regulations. EPA, State and OSHA requirements must be met during the removal of ACM and during demolition due to the presence of LBP. These regulations will be addressed in the MDNR B/VCP Remediation Plan and Health and Safety Plan.

ACM identified at the site includes:

- Approximately 20 ft² of 9" X 9" tan floor tile/black mastic at the south entrance stairs
- Approximately 50 ft² of square pattern linoleum/yellow mastic at the east entryway
- Approximately 150 ft² of exterior boiler insulation in the basement on the south boiler
- Approximately 430 ft² of transite panels on the east and south sides of the exterior of the building and west side above the garage door
- Approximately 150 ft² of exterior wall panel mastic on the east side of the exterior of the building under the plastic panels
- Approximately 530 linear ft of 3-6" aircell pipe insulation in the basement and in the manufacturing area
- Approximately 12" piping joint insulation in the basement on the south boiler.

Cost

Estimated abatement costs were gathered from local vendors. Costs per ft² or linear ft are provided, and include removal and disposal costs. Abatement cost for the ACM associated with the site building is estimated at \$36,755. A detailed breakdown of abatement costs is provided in Table 1. Additional costs to be considered, particularly if the site would be enrolled in the MDNR B/VCP, include those for technical reports (RAP and Final Abatement Report) and collection of clearance samples. Estimated cost of technical plans/reports is \$3,500 per plan/report (cost of plans includes consideration of all environmental issues to be addressed by cleanup activities). Additional costs for oversight and clearance

sampling are considered variable based on requirements and duration of abatement. Estimated cost associated with oversight and clearance is \$4,500.

TABLE 1
ASBESTOS-CONTAINING MATERIAL ABATEMENT COSTS
MEAD HANSEN BUILDING, ST. JOSEPH, MISSOURI

Material Description	Material Locations	Estimated Quantity	Cost/Unit (\$/SF or \$/LF)	Total Cost
9" x 9" Tan Floor Tile/Black Mastic	South Entrance, Stairs	20 SF	\$5.50	\$110.00
Square Pattern Linoleum/Yellow Mastic	East Entryway	50 SF	\$8.00	\$400.00
Exterior Boiler Insulation	Basement – South Boiler	150 SF	\$55.00	\$8,250.00
Exterior Transite Panels	East and South Sides Behind Black Paneling, West Side Above Garage Door – Exterior Panels	430 SF	\$4.00	\$1,720.00
Exterior Wall Panel Mastic	East Side Exterior – Under Plastic Panels	150 SF	\$4.00	\$600.00
3" Aircell Pipe Insulation	Throughout Basement	180 LF	\$45.00	\$8,100.00
6" Aircell Pipe Insulation	Throughout Manufacturing Area	350 LF	\$50.00	\$17,500.00
Piping Joint Insulation	Basement – South Boiler	12" Joint	\$75.00 each	\$75.00
Total ACM Abatement Cost				\$36,755.00

Notes:

ACM Asbestos-containing material
LF Linear foot
SF Square foot

5.2.2 Lead-Based Paint

Two cleanup alternatives were evaluated to address LBP found on structures associated with the subject property: (1) no action and (2) removal by demolition. Alternative 2 can achieve clearance criteria under the MDNR B/VCP.

Alternative 1: No Action

Alternative 1 (no action) would leave LBP in place at the site.

Effectiveness

This alternative would not be effective if site buildings are demolished. Restrictions on proposed demolition of materials containing LBP (depending on condition of the LBP) would be necessary to

ensure those materials remain undisturbed. This alternative would also be ineffective in achieving the goal of reducing health risks.

Implementation

Implementation of this alternative would be straightforward—leaving the LBP in place.

Cost

This alternative would not involve any direct costs.

Alternative 2: LBP Stabilization and Application of Encapsulation

Alternative 2 includes stabilization of LBP in poor condition (chipping, flaking, etc.) and application of an encapsulant to all LBP surfaces. The encapsulant would be a durable, air- and dust-tight, surface coating material. Application of the encapsulant would ensure that LBP remaining could not leach to the surface and pose a threat to future occupants. In accordance with state regulations, the condition of LBP-containing surfaces should be inspected, and removal of loose (chipped, flaking, etc.) LBP would be required. The removed LBP residue should be segregated for proper disposal.

Waste generation and amount of material sent for disposal would be less than under Alternative 3. Regulatory clearance would be obtained through successful implementation of a pre-approved RAP and pre-/post-encapsulation inspections by MDNR. In addition, collection of dust-wipe samples in accordance with MDNR clearance regulations would be necessary after completion of all interior renovations in order to verify that all lead dust levels are below MDNR clearance levels.

Effectiveness

Encapsulation is a relatively simple process that does not significantly alter structural conditions. This alternative would be feasible if the building is to be renovated. For sites enrolled in the MDNR B/VCP, MDNR requires creation of an O&M Plan to document presence and location of LBP, and future maintenance procedures regarding LBP.

Implementation

Stabilization and encapsulation by a licensed State of Missouri lead abatement contractor would accord with applicable state and federal regulations. Encapsulation is not a viable alternative for surfaces subject to impact or friction. Encapsulation requires follow-up inspections, maintenance, and possible building

restrictions. Abatement by a registered lead paint contractor would accord with applicable state and federal regulations. Segregation and proper disposal of LBP residue removed during stabilization activities (likely as hazardous waste) would be required. Because this technique can generate a hazardous waste stream, careful consideration of precautions concerning worker health and safety would be necessary.

Cost

Estimated costs were gathered from local vendors. Estimated cost of stabilization and encapsulating is \$3.50 per SF or LF. Assuming all surfaces containing LBP would require stabilization/encapsulation, the cost of Alternative 3 is estimated at \$7,511. Additional costs to be considered, particularly if the site would be enrolled in the MDNR B/VCP, include technical reports (RAP and Final Abatement Report) and collection of clearance samples. Estimated cost of technical plans/reports is \$3,500 per plan/report (cost of plans include consideration of all environmental issues to be addressed by cleanup activities). Additional costs for oversight and clearance sampling are estimated at \$5,000. This estimated cost may vary depending on the abatement techniques applied. No restoration costs have been accounted for. Total cost for Alternative 2 is estimated at \$16,011.

Alternative 3: Lead-Based Paint Removal by Demolition

Alternative 3 includes removal (by demolition) for proper disposal. All surfaces/components that contain LBP determined to be in good condition can be removed/demolished and disposed of as demolition waste—assuming satisfactory results of a disposal characterization test using Toxicity Characterization Leaching Procedure (TCLP) analysis prior to disposal of the demolition debris. Application of removal/demolition techniques would be necessary in a manner that does not chip, shred, mulch, or mill the LBP. For the future site use scenario for the subject property building (i.e., demolition), this alternative is likely the most appropriate and economically feasible. Costs specified below assume removal of materials containing LBP.

This alternative is a direct approach, because LBP would be removed, and controls would not be required to manage LBP left in place prior to building demolition. Removal and off-site disposal of LBP-containing material as special (demolition) waste would occur. Disposal characterization testing would be required prior to disposal.

Effectiveness

If all identified LBP is removed, Alternative 2 would be effective in eliminating the risk to human health posed by the LBP. This alternative would allow for demolition of site buildings without restrictions pertaining to disturbance and management of LBP.

Implementation

Abatement would accord with applicable state and federal regulations. Surfaces coated with LBP would be disposed of with general building demolitions debris. EPA, State and OSHA requirements must be met during the removal of ACM and during demolition due to the presence of LBP. These regulations will be addressed in the MDNR B/VCP Remediation Plan and Health and Safety Plan.

Cost

Estimated costs of this alternative were gathered from local vendors. Prior to disposal, demolition debris would require characterization via TCLP analysis. Assuming 20 samples will be collected for TCLP analysis, estimated cost is \$2,500. Additional costs to be considered, particularly if the site would be enrolled in the MDNR B/VCP, include technical reports (RAP and Final Abatement Report).

5.3 RECOMMENDED CLEANUP ALTERNATIVES

5.3.1 Asbestos-Containing Material

Alternative 3—Abatement—is the recommended cleanup alternative for ACM identified at the site. Removal of all identified ACM would be most effective in removing the risk to human health posed by the ACM.

5.3.2 Lead-Based Paint

Alternative 3—LBP removal by demolition—is the recommended cleanup alternative for LBP identified at the site. This is the most cost-effective and direct option for addressing LBP at the site.

5.3.3 Building Demolition

In addition to the above cleanup alternatives, an estimated cost for demolition of the building has been included in Table 2. The building demolition costs have been estimated by applying selected functions of

RACER® Version 11.2.16.0. RACER costs for building demolition and site redevelopment are included in Appendix B.

5.3.4 Institutional Controls and Long-Term Stewardship

This ABCA has been prepared with the understood proposed future use of the site as a paved parking area for the adjacent City of St. Joseph Fire Department. The Tier I Risk Assessment performed agreed with the conclusion of the Phase II TBA that no remediation of environmental media may be necessary based on the anticipated future use of the site and the nature and extent of contamination detected in soil and groundwater. However, institutional controls in the form of deed restrictions/environmental covenants prohibiting residential development on the property and installation of drinking water wells should be implemented. Estimated costs for institutional controls and long-term stewardship, including five-year reviews over a 30-year time period, have been included in Table 2. Costs were estimated by applying selected functions of RACER® Version 11.2.16.0 and professional judgment. Cost details are included in Appendix B.

TABLE 2
SUMMARY OF COSTS
MEAD HANSEN BUILDING, ST. JOSEPH, MISSOURI

Media	Recommended Alternative	Action – Cost	Total Cost
ACM	Alternative 3 – Abatement	Abatement – \$36,755	\$44,755
		Oversight and Clearance Sampling –\$4,500	
		Technical Reporting – \$3,500	
LBP	Alternative 3 – Removal of LBP via Demolition	TCLP Analysis – \$2,500	\$2,500
MDNR Brownfields/Voluntary Cleanup Program Fees			\$5,200
Estimated Building Demolition Cost			\$812,000
Institutional Controls (deed restriction)			\$36,000
Long-Term Stewardship (five-year reviews over 30 years)			\$60,000
Total Cost			\$960,455

Notes:

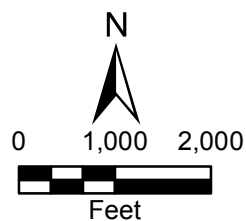
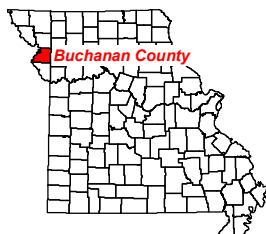
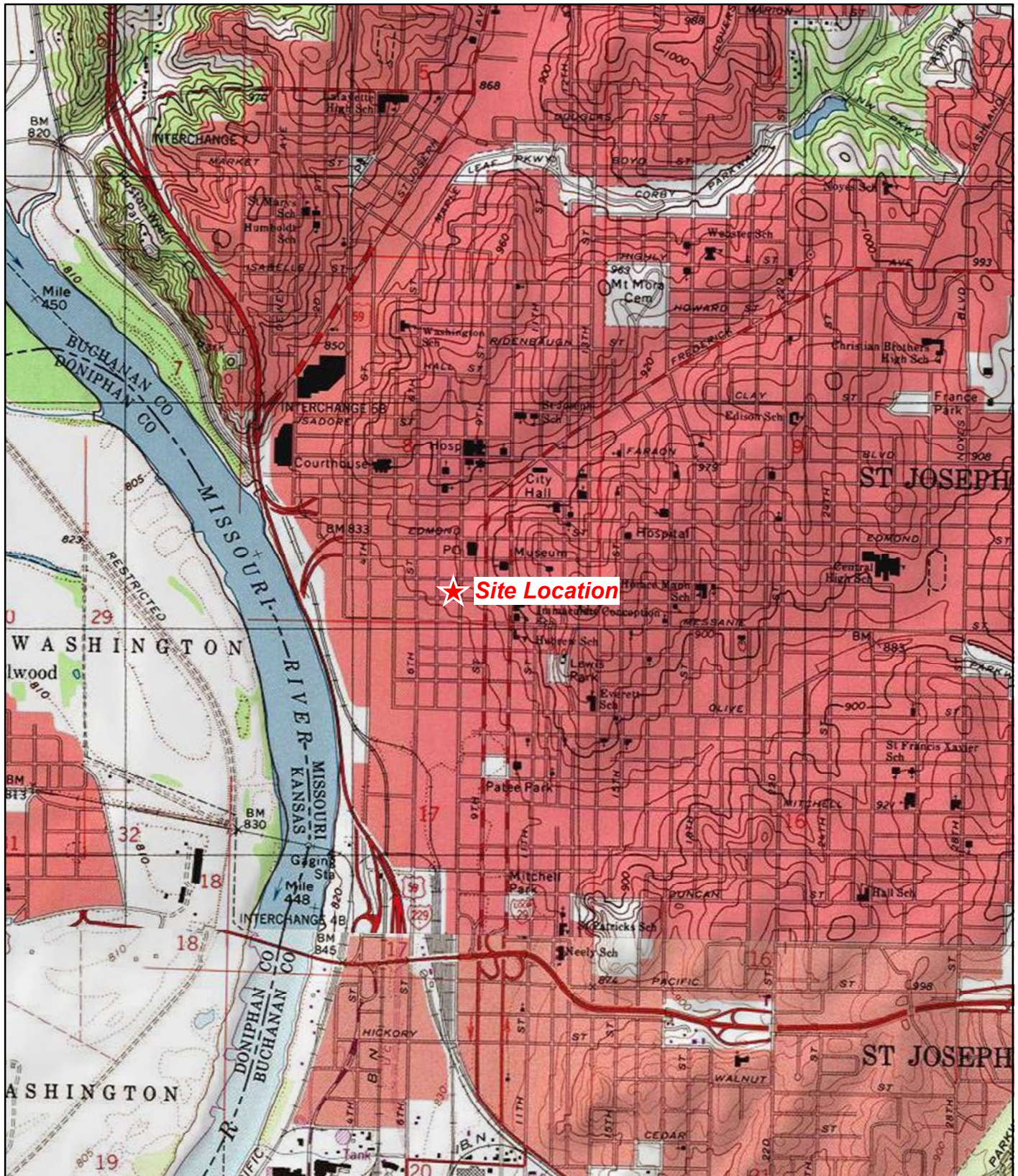
ACM Asbestos-containing material
LBP Lead-based paint
MDNR Missouri Department of Natural Resources
TCLP Toxicity characteristic leaching procedure

6.0 REFERENCES

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- Missouri Department of Natural Resources (MDNR). 2017. Air Pollution Control Program Fact Sheet – Asbestos Requirements for Demolition and Renovation Projects. May.
- Seagull Environmental Technologies, Inc. (Seagull). 2016. Phase I Environmental Site Assessment, Mead Hansen Building, 408 South 8th Street, St. Joseph, Buchanan County, Missouri. October 18.
- Tetra Tech, Inc. (Tetra Tech). 2018a. Tier I Risk Assessment – Mead Hansen Building, 408 S. 8th Street, St. Joseph, Buchanan County, Missouri. December.
- Tetra Tech. 2018b. Phase II Targeted Brownfields Assessment – Mead Hansen Building, 408 S. 8th Street, St. Joseph, Buchanan County, Missouri. April.
- Tetra Tech. 2018c. Targeted Brownfields Assessment Survey Report for Asbestos, Lead-Based Paint, and Polychlorinated Biphenyls – Mead Hansen Building, 408 S. 8th Street, St. Joseph, Buchanan County, Missouri. April.
- U.S. Department of Housing and Urban Development (HUD). 1997. *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*.
- U.S. Geological Survey (USGS). 1997. St. Joseph North, Missouri Quadrangle. USGS 7.5-Minute Topographic Series.

APPENDIX A

FIGURES



Mead Hansen Building
408 S 8th Street
St. Joseph, Missouri

Figure 1
Site Location Map

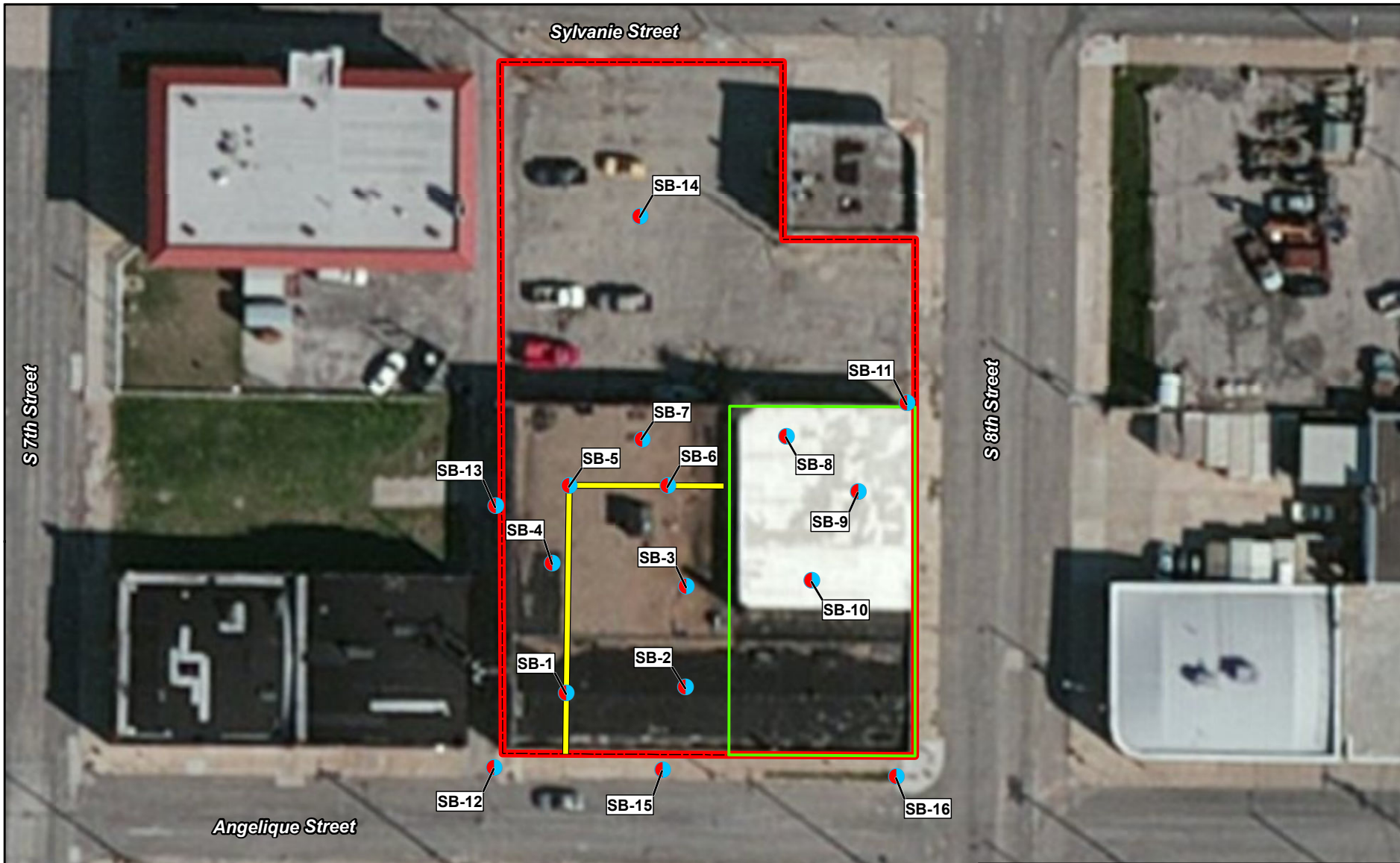


Source: USGS Saint Joseph North, MO 7.5 Minute Topo Quad, 1981;
USGS Saint Joseph South, MO 7.5 Minute Topo Quad, 1981.

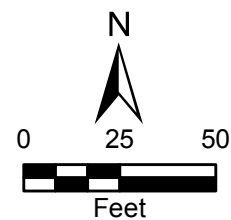
Date: 8/9/2017

Drawn By: Nick Wiederholt

Project No: X9025.14.0002.043



- Legend
- Soil and groundwater sample location
 - Former trench drain
 - Approximate site boundary
 - Basement extent



Mead Hansen Building
408 S 8th Street
St. Joseph, Missouri

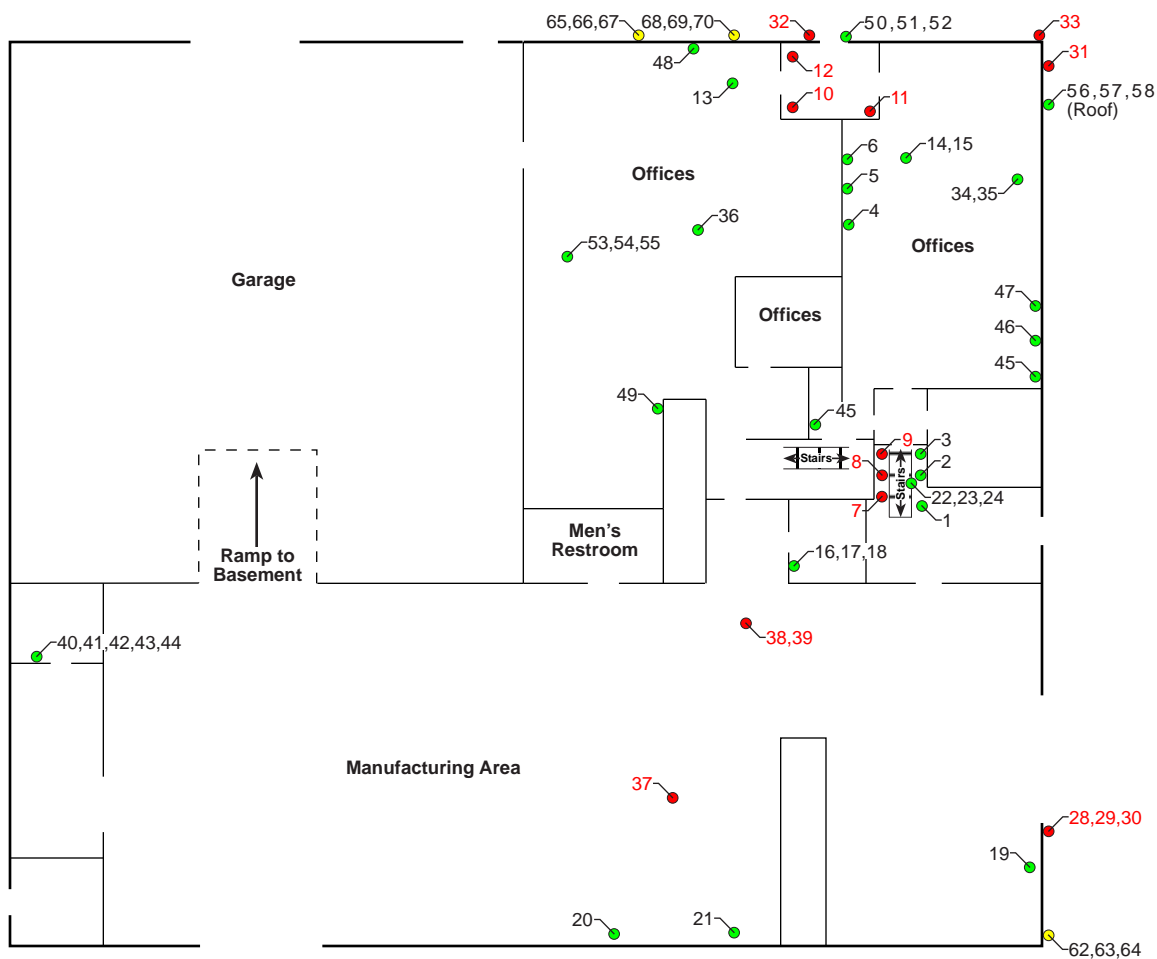
Figure 2
Boring Location Map



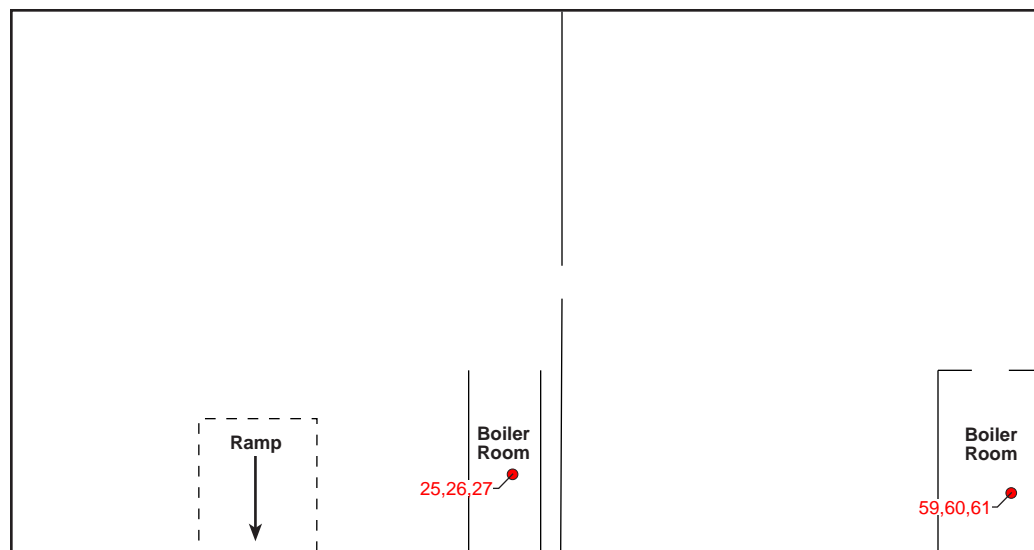
Sample Key Table

Key	Sample No.
Asbestos	
1	CT1-1
2	CT1-2
3	CT1-3
4	WM-1
5	WM-2
6	WM-3
7	FT-1
8	FT-2
9	FT-3
10	LIN-1
11	LIN-2
12	LIN-3
13	TERR-1
14	TERR-2
15	TERR-3
16	WG-1
17	WG-2
18	WG-3
19	WG1-1
20	WG1-2
21	WG1-3
22	FT1-1
23	FT1-2
24	FT1-3
25	IN-1
26	IN-2
27	IN-3
28	Transite-1
29	Transite-2
30	Transite-3
31	WM1-1
32	WM1-2
33	WM1-3
34	CT-1
35	CT-2
36	CT-3
37	Airocell-1
38	Airocell-2
39	Airocell-3
40	DW-1
41	DW-2
42	DW-3
43	DW-4
44	DW-5
45	PLSC-1
46	PLSC-2
47	PLSC-3
48	PLSC-4
49	PLSC-5
50	DC-1
51	DC-2
52	DC-3
53	PLS-1
54	PLS-2
55	PLS-3
56	RM-1
57	RM-2
58	RM-3
59	J-1
60	J-2
61	J-3
62	C4-1
63	C4-2
64	C4-3
65	DC-2-1
66	DC-2-2
67	DC-2-3
68	C1-1
69	C1-2
70	C1-3

First Floor



Basement



Legend

- ACM Sample Location
 - Non-ACM Sample Location
 - Non-ACM and Non-PCB Sample Location
- ACM Asbestos Containing Material
PCB Polychlorinated Biphenyl



Not to Scale

Mead Hansen Building
408 S 8th Street
St. Joseph, Missouri

Figure 3
Asbestos Sample Location Map



Date: 1/31/18

Drawn By: Nick Wiederholt

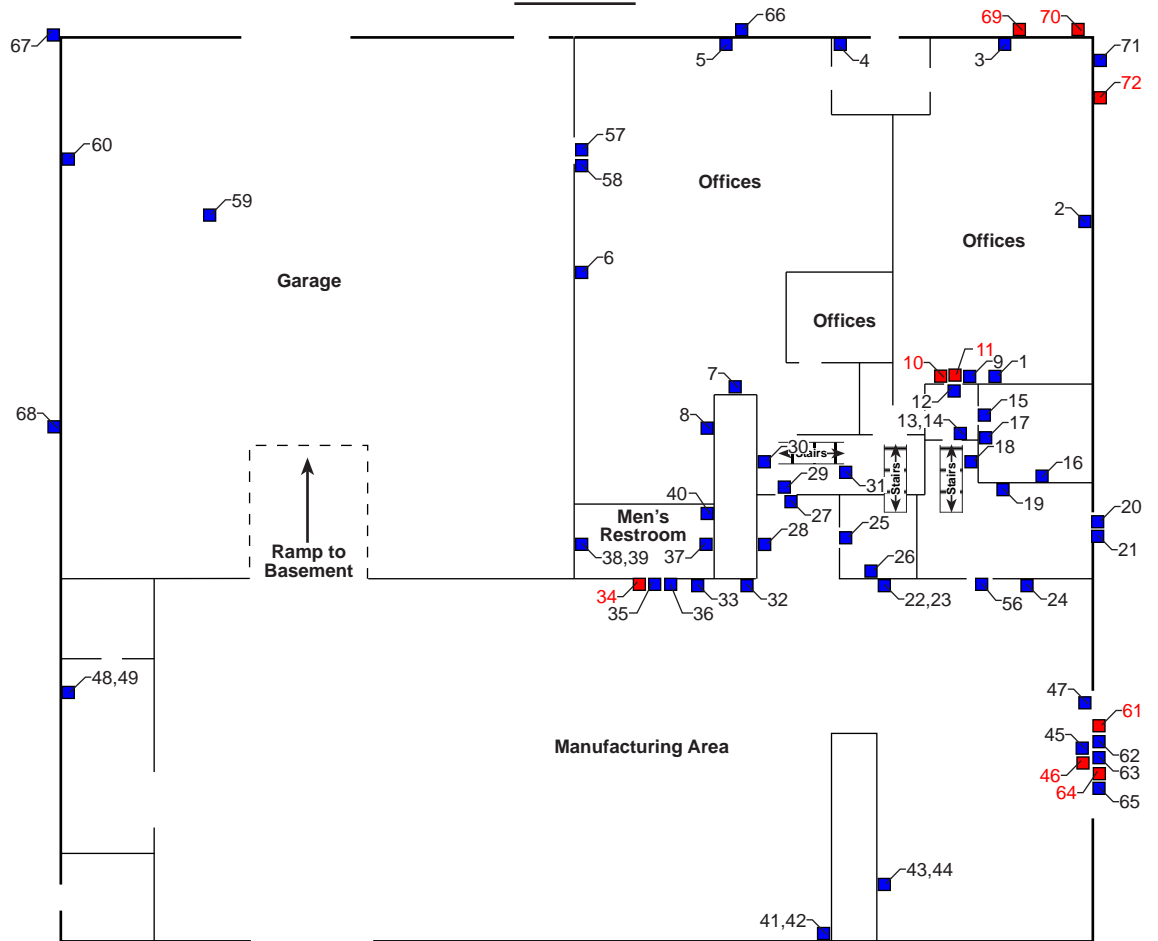
Project No: X9025.14.0002.043

Note: Refer to Sample Key Table for corresponding sample numbers.

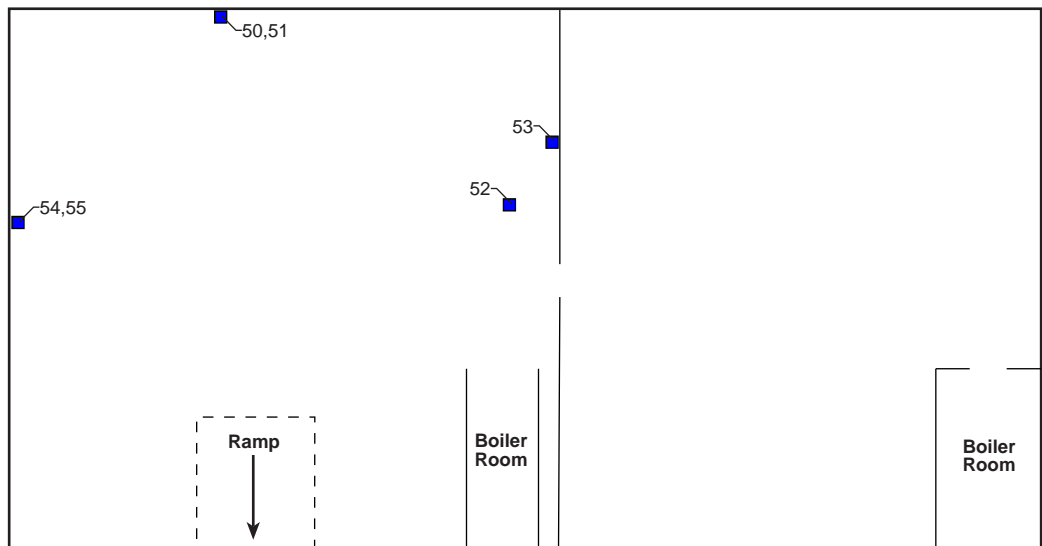
Sample Key Table

Sample No.
Lead
1
2
3
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16
17
18
19
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72

First Floor



Basement



Legend

- LBP Containing Material Sample Location
- Non-LBP Containing Material Sample Location

LBP Lead-based Paint



Not to Scale

Mead Hansen Building
408 S 8th Street
St. Joseph, Missouri

Figure 4
LBP Sample Location Map



Note: Refer to Sample Key Table for corresponding sample numbers.

Date: 1/31/18

Drawn By: Nick Wiederholt

Project No: X9025.14.0002.043

APPENDIX B

BUILDING DEMOLITION AND SITE REDEVELOPMENT COST ESTIMATES

Appendix B
Building Demolition and Site Redevelopment Cost Estimate
Mead Hansen Building Site
St. Joseph, Buchanan County, Missouri

BUILDING DEMOLITION AND SITE REDEVELOPMENT				
Table B-1				
Building Demolition and Site Redevelopment				
Source	Description	Subtotal	Contingency	Total (Rounded)
Table B-2	Design and Construction	\$ 738,414	\$ 73,841	\$ 812,000
Contingency	10%			\$ 73,841
Total				\$ 812,000

Appendix B
Building Demolition and Site Redevelopment Cost Estimate
Mead Hansen Building Site
St. Joseph, Buchanan County, Missouri

Capital Cost

Location factor (for zip code 433xx)	
ECHOS	1
Get-a-Quote	1.04

Note: Location factor applies only to national average unit costs; it does not apply to local unit costs such as from vendors or Means.

Overhead and Profit (O&P)		
General	25%	Typical general contractor overhead and profit
Means	-	
RACER	35%	Default
Contractor quote	5%	Prime contractor markup
Professional judgment	-	Not marked-up

Inflation	2.04%	Avg. annual inflation from 2010 to 2019
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Table B-2								
Building Demolition and Site Redevelopment								
Item	Description	Quantity	Unit	Source	Year	Unit Price	Unit Price (Incl. O&P and Inflation)	Total Cost
	Construction Subtotal							\$ 738,414
	Building Demolition - Masonry Portion							\$ 153,370
1	Demolition of masonry structure	134,400	cubic feet	RACER	2015	\$ 0.25	\$ 0.36	\$ 48,191
2	Wheel loader (4.0 cubic yards)	19	hour	RACER	2015	\$ 145.22	\$ 208.28	\$ 3,957
3	Dump truck (26 cubic yards)	133	hour	RACER	2015	\$ 131.88	\$ 189.15	\$ 25,157
4	Dump charges	3,696	cubic yard	Contractor quote	2019	\$ 20.00	\$ 20.58	\$ 76,065
	Demolition of Slab Foundation							\$ 96,530
5	Demolition of reinforced concrete	276.54	cubic yard	RACER	2015	\$ 199.06	\$ 285.50	\$ 78,953
6	Wheel loader (1.25 cubic yards)	8	hour	RACER	2015	\$ 103.42	\$ 148.33	\$ 1,187
7	Dump truck (8 cubic yards)	48	hour	RACER	2015	\$ 114.01	\$ 163.52	\$ 7,849
8	Dump charges	415	cubic yard	Contractor quote	2019	\$ 20.00	\$ 20.58	\$ 8,541
	Building Demolition - Metal Portion							\$ 125,270
9	Demolition of steel structure	89,600	cubic feet	RACER	2015	\$ 0.19	\$ 0.27	\$ 24,417
10	Wheel loader (2.0 cubic yards)	55	hour	RACER	2015	\$ 114.61	\$ 164.38	\$ 9,041
11	Dump truck (20 cubic yards)	166	hour	RACER	2015	\$ 123.02	\$ 176.44	\$ 29,289
12	Dump charges	3,038	cubic yard	Contractor quote	2019	\$ 20.00	\$ 20.58	\$ 62,523
	Basement Demolition							\$ 71,210
13	Demolition of concrete structure	56,000	cubic feet	RACER	2015	\$ 0.25	\$ 0.36	\$ 20,080
14	Wheel loader (2.0 cubic yards)	27	hour	RACER	2015	\$ 114.61	\$ 164.38	\$ 4,438
15	Dump truck (20 cubic yards)	85	hour	RACER	2015	\$ 123.02	\$ 176.44	\$ 14,998
16	Dump charges	1,540	cubic yard	Contractor quote	2019	\$ 20.00	\$ 20.58	\$ 31,694
	Demolition of Existing Parking Lot							\$ 53,030
17	Demolition of asphalt	261.62	cubic yard	RACER	2015	\$ 97.00	\$ 139.12	\$ 36,397
18	Wheel loader (1.25 cubic yards)	8	hour	RACER	2015	\$ 103.42	\$ 148.33	\$ 1,187
19	Dump truck (8 cubic yards)	45	hour	RACER	2015	\$ 114.01	\$ 163.52	\$ 7,358
20	Dump charges	393	cubic yard	Contractor quote	2019	\$ 20.00	\$ 20.58	\$ 8,088

Appendix B
Building Demolition and Site Redevelopment Cost Estimate
Mead Hansen Building Site
St. Joseph, Buchanan County, Missouri

Table B-2 Continued								
Building Demolition and Site Redevelopment								
Item	Description	Quantity	Unit	Source	Year	Unit Price	Unit Price (Incl. O&P and Inflation)	Total Cost
	Site Redevelopment							\$ 239,004
21	Backfill (including delivery, spreading, and compaction)	2,074	cubic yard	RACER	2015	\$ 28.47	\$ 40.83	\$ 84,688
22	Rough grading	3,780.02	square yard	RACER	2015	\$ 0.40	\$ 0.57	\$ 2,169
23	Fine grading	3,780.02	square yard	RACER	2015	\$ 0.59	\$ 0.85	\$ 3,199
24	Soil excavation	575.51	cubic yard	RACER	2015	\$ 6.78	\$ 9.73	\$ 5,599
25	Shallow trenching	100.73	bulk cubic yard	RACER	2015	\$ 1.10	\$ 1.58	\$ 159
26	Compaction	959.18	embankment cubic yard	RACER	2015	\$ 2.79	\$ 4.00	\$ 3,838
27	Dry roll gravel	3,453.04	square yard	RACER	2015	\$ 1.21	\$ 1.74	\$ 5,993
28	Backfill and compaction by hand	52.72	embankment cubic yard	RACER	2015	\$ 13.50	\$ 19.36	\$ 1,021
29	Gravel (delivered and dumped)	575.51	cubic yard	RACER	2015	\$ 37.59	\$ 53.91	\$ 31,028
30	Concrete curb and gutter	721.82	linear feet	RACER	2015	\$ 22.26	\$ 31.93	\$ 23,045
31	Prime coat	3,453.04	square yard	RACER	2015	\$ 0.71	\$ 1.02	\$ 3,516
32	Asphalt wearing course, 3-inches thick	281.64	ton	RACER	2015	\$ 82.00	\$ 117.61	\$ 33,123
33	Area drain with grate (24-inch diameter, 5-feet deep)	5	each	RACER	2015	\$ 3,327.71	\$ 4,772.78	\$ 23,864
34	Painting on pavement for parking stalls (white, 4-inch wide)	69	each	RACER	2015	\$ 7.59	\$ 10.89	\$ 751
35	Reinforced concrete pipe (12-inch)	200.10	linear feet	RACER	2015	\$ 42.53	\$ 61.00	\$ 12,206
36	Reinforced concrete pipe (18-inch)	75.90	linear feet	RACER	2015	\$ 44.14	\$ 63.31	\$ 4,805
Capital Cost Subtotal								\$ 738,414

Notes:
O&P Overhead and profit